



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO.                                     | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.           | CONFIRMATION NO.       |
|---|-------------|----------------------|-------------------------------|------------------------|
| 10/722,174  | 11/25/2003  | MacKenzie King       | ATMI-688                      | 7009                   |
| 25559   | 7590        | 06/05/2007           |                               |                        |
| ATMI, INC.<br>7 COMMERCE DRIVE<br>DANBURY, CT 06810 |             |                      | EXAMINER<br>SMITH, NICHOLAS A |                        |
|   |             |                      | ART UNIT<br>1742              | PAPER NUMBER           |
|   |             |                      | MAIL DATE<br>06/05/2007       | DELIVERY MODE<br>PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

|                              |                                      |                                    |  |
|------------------------------|--------------------------------------|------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/722,174 | <b>Applicant(s)</b><br>KING ET AL. |  |
|                              | <b>Examiner</b><br>Nicholas A. Smith | <b>Art Unit</b><br>1742            |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 15 May 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 1-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 14-34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn. See new grounds of rejection stated below.

### **Status of Claims**

2. Claims 14-34 remain for examination.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 14-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Andricacos et al. (US 5,352,350).
5. In regards to claim 14, Andricacos et al. discloses an electrochemical deposition apparatus, a computation module constructed and arranged to perform a regression analysis, solving dependent variable equations and a control assembly capable of modulating copper electrochemical deposition (Figs. 2, 3A and 3B, example 2). Andricacos et al. is configured with a computation module capable of performing a regression analysis and specifically discloses utilizing a wafer-based independent variable, such as the time integral of the plating current (col. 6, lines 41-63).

6. Furthermore, In regards to claim(s) 14 "said computational module being adapted for coupling in signal processing, monitoring and control relationship with the electrochemical deposition system when said electrochemical deposition system is arranged with the wafer being plated constituting a cathode element of an electrochemical cell including said copper plating anode, and said computational module being arranged to process an electrode parameter of said wafer as said wafer-based independent variable in said regression analysis," Andricacos teaches such a computational module adapted for coupling the claimed limitations as stated above (Fig. 2 and col. 6, lines 41-63) Andricacos et al. discloses plating current is an electrode parameter of said wafer-based independent variable and thus meets the claimed limitation (col. 6, lines 41-63).

7. In regards to claim 15, Andricacos et al. discloses a wafer-based independent variable, such as plating current (col. 6, lines 41-53).

8. In regards to claim 16-21, Andricacos et al. discloses a typical bath composition found in copper electroplating, including many of the claimed elements (Example 2). However, an apparatus is not distinguished from the prior art by which bath composition is used bath, as long as prior art apparatus is capable of holding such a composition. See MPEP 2114. In the instant case, Andricacos et al. discloses a plating cell capable of contained the electrolyte in the claimed composition.

9. In regards to claim 22-26, Andricacos et al. discloses a dependent variable as at least one component of electrochemical deposition medium, including specific additives

Art Unit: 1742

(abstract, Fig. 2, and Example 2). Furthermore, Andricacos et al.'s apparatus is capable of employing the claimed additives as dependent variables.

10. In regards to claim 27-30, Andricacos et al. does not specifically disclose a control assembly comprising variable output power. However, such a variable output power supply would be inherently present in an electrochemical plating cell in order to function and would have to be able to vary between off and on modes to control the process. Andricacos et al. disclose at least three variable flow controls capable of delivering the claimed additive components of electrochemical deposition medium (Fig. 2, col. 6, lines 41-53, Example 2).

11. In regards to claims 31, Andricacos et al. discloses an electrochemical deposition system to control copper electrochemical deposition therein (Example 2).

***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

a. A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andricacos et al. in view of Chung et al. (US 6,409,903).

14. In regards to claim(s) 32, Andricacos et al. does not specifically disclose a wafer as an electrode component of an electrochemical cell.

15. Chung et al. discloses a wafer as an electrode component of an electrochemical cell include contacts and a seed layer (col. 4, line 62 to col. 5, line 8). It would have

Art Unit: 1742

been obvious to one of ordinary skill in the art to modify Andricacos et al. apparatus with Chung et al.'s wafer as an electrode component in order to plate copper on the wafer (Chung et al., col. 5, lines 9-12).

16. In regards to claims 33-34, Andricacos et al. discloses a dependent variable as such as plating current (col. 6, lines 41-53). Andricacos et al. in view of Chung et al. teaches that the wafer is electrically contacted and thus the plating current would be a wafer-based electrode parameter as claimed.

### ***Conclusion***

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nicholas A. Smith whose telephone number is (571)-272-8760. The examiner can normally be reached on 8:30 AM to 5:00 PM, Monday through Friday.

18. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571)-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1742

19. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

NAS

  
ROY KING  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700